

Integrated Coastal Management

A Context for Addressing Coral Reef Issues associated with Climate Change ?



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Summary

- Lessons learned from 30 years of coastal management planning and implementation should be applied to coral reef conservation issues
- Coastal management programs can provide a context for some but not all management issues related to climate change and coral bleaching
- Mass coral bleaching issues and solutions must be integrated within an overall coral reef and coastal management strategy

Coral Reef Governance

- **Globally**

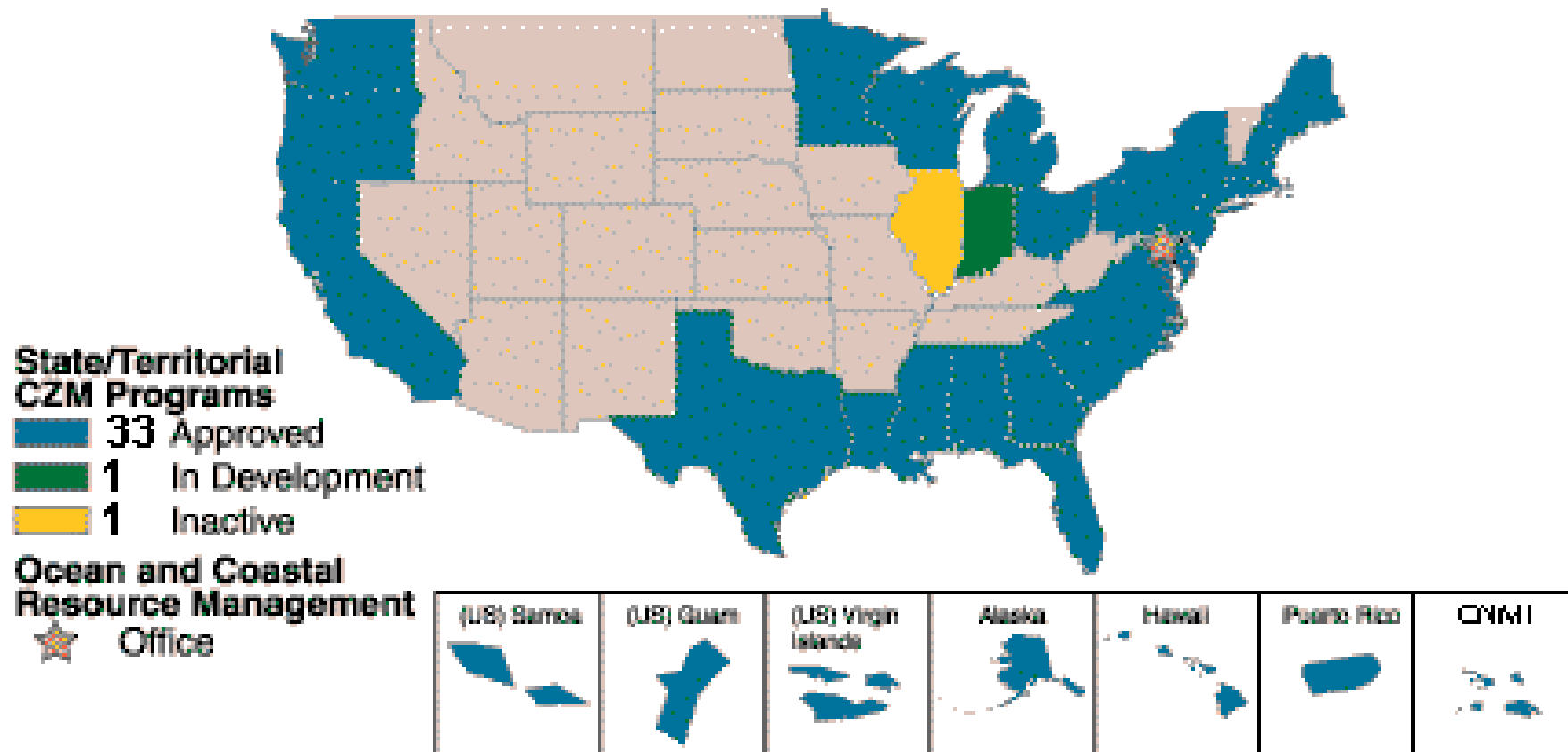
- < ?? % of world's coral reefs located within a protected area

- **United States and Territories**

- ?? % of coral reefs included in some form of marine protected area (data under development)

- 99% of the US coastline is included in the National Coastal Zone Management Program; as is Puerto Rico, American Samoa, US Virgin Islands, CNMI

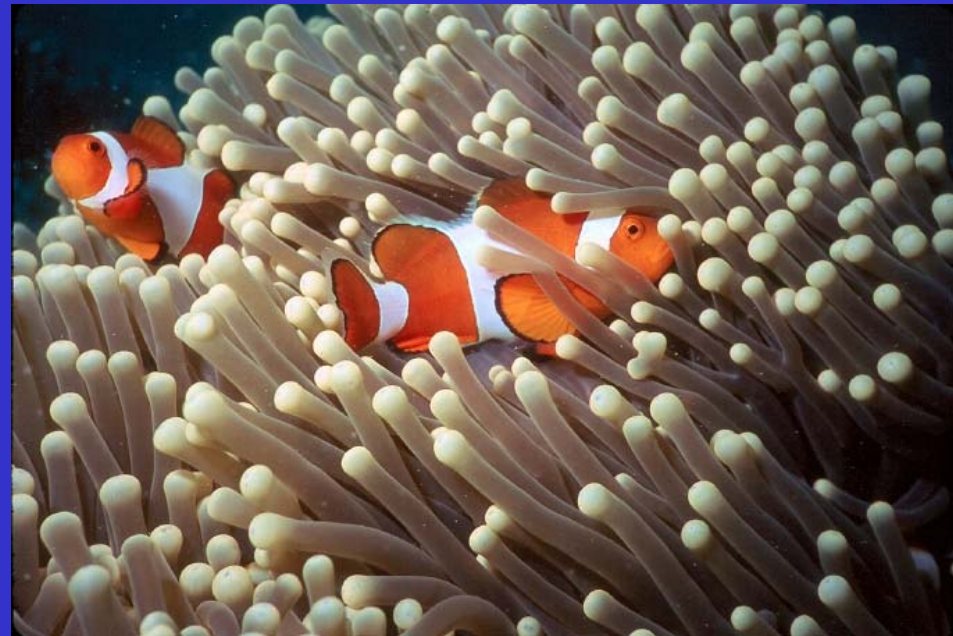
Coastal Zone Management Program



CZM Programs

All Islands Coral Reef Initiative

- Catalyzed by CZM program managers
- NOAA grants
- Utilizes CZM program structures
 - Staff
 - Interagency groups



The Fundamental Goal of ICM

Improve the quality of life of human communities which depend on coastal resources while maintaining the biological diversity and productivity of coastal ecosystems.

How? Through a continuous and dynamic process that unites government and the community, sciences and management and sectoral and public interest in preparing and implementing an integrated plan for the protection and development of coastal ecosystems and resources.

(Source: GESAMP, 1991)



USCZM Program Attributes (+)

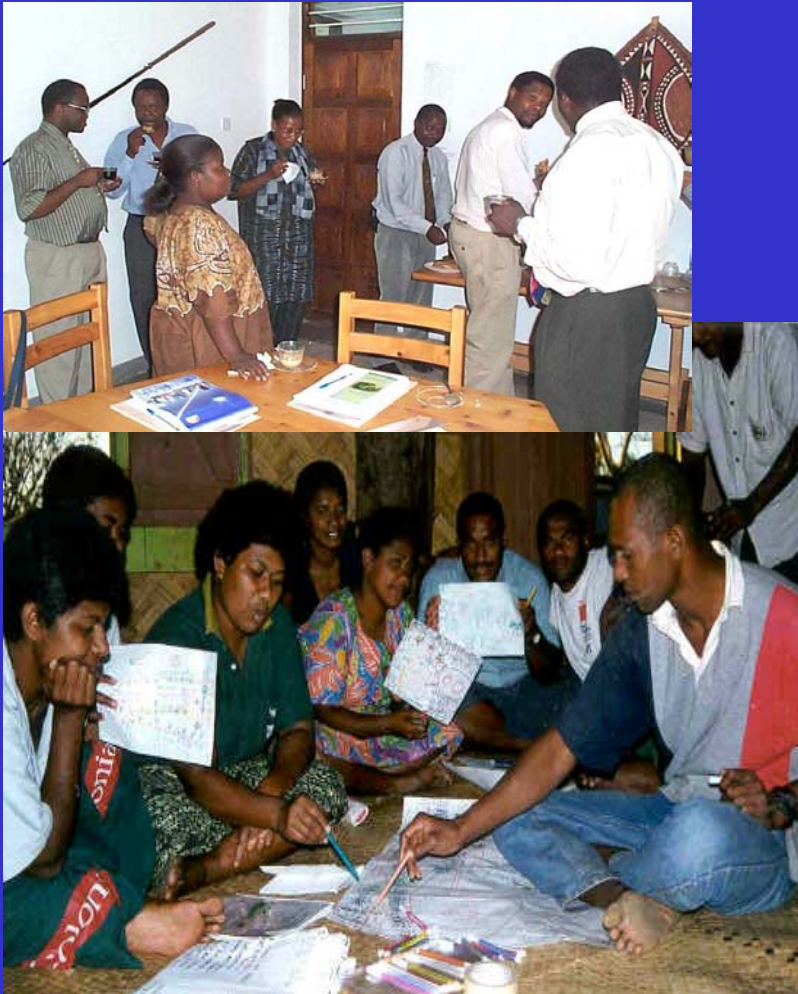
- **Voluntary State/Federal Partnership**
 - state and local level planning and implementation to meet national goals
- **Meaningful Incentives for Program Participation**
 - funding
 - consistency
- **Participatory planning**
- **Existing Inter-agency governance mechanisms**
- **Programs have geographic as well as issue focus**
- **Multiple approaches to management**
 - regulatory-non-regulatory
 - reactive-proactive
- **Continuity and experience**

CZM Program Attributes (-)



- Emphasis on short-term, urgent issues
- Program boundaries frequently narrow;
- Water quality and fisheries issues not always directly addressed
- CZM Programs address proximate, not root causes of problems

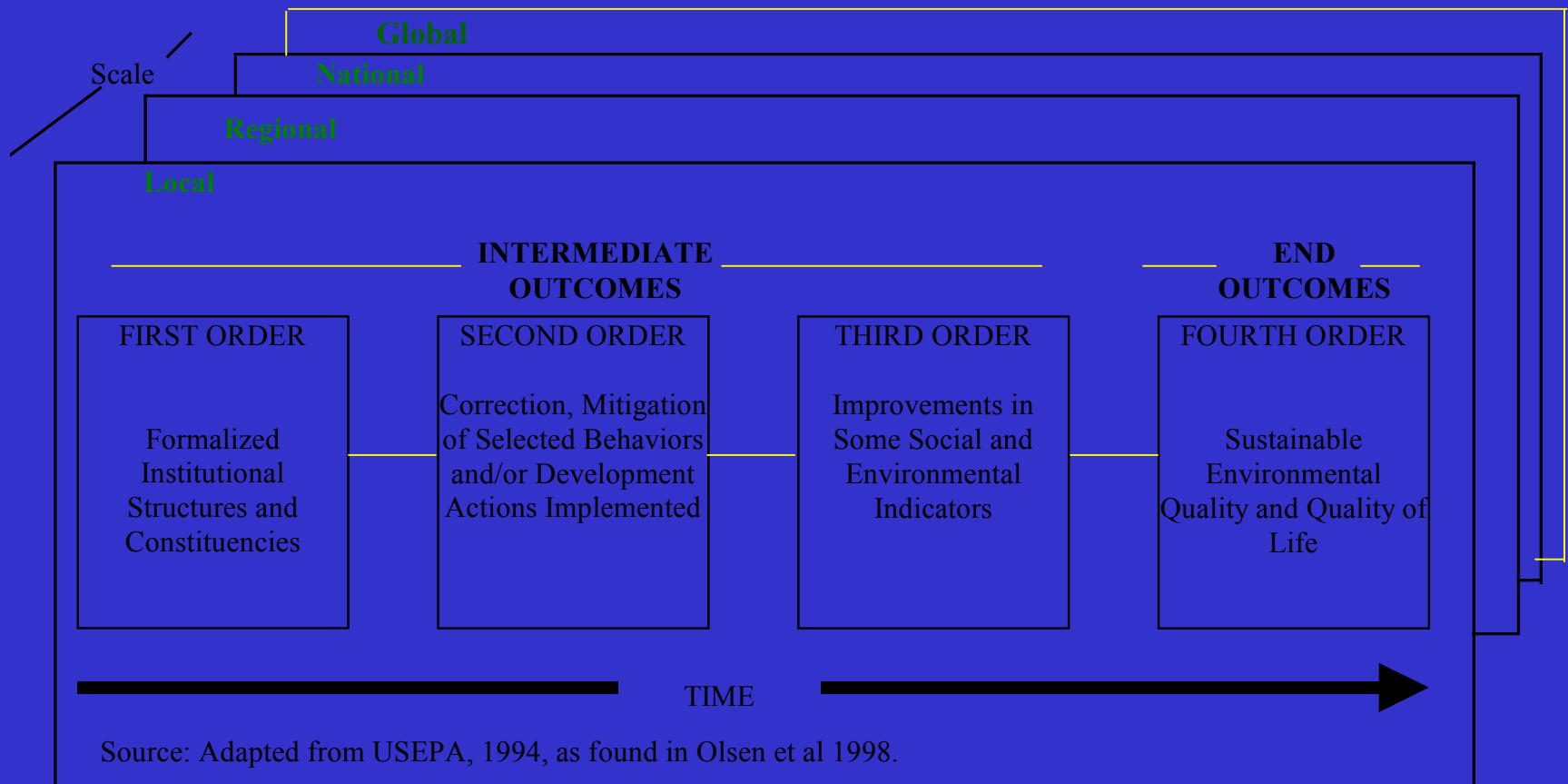
Local Action Strategy Attributes



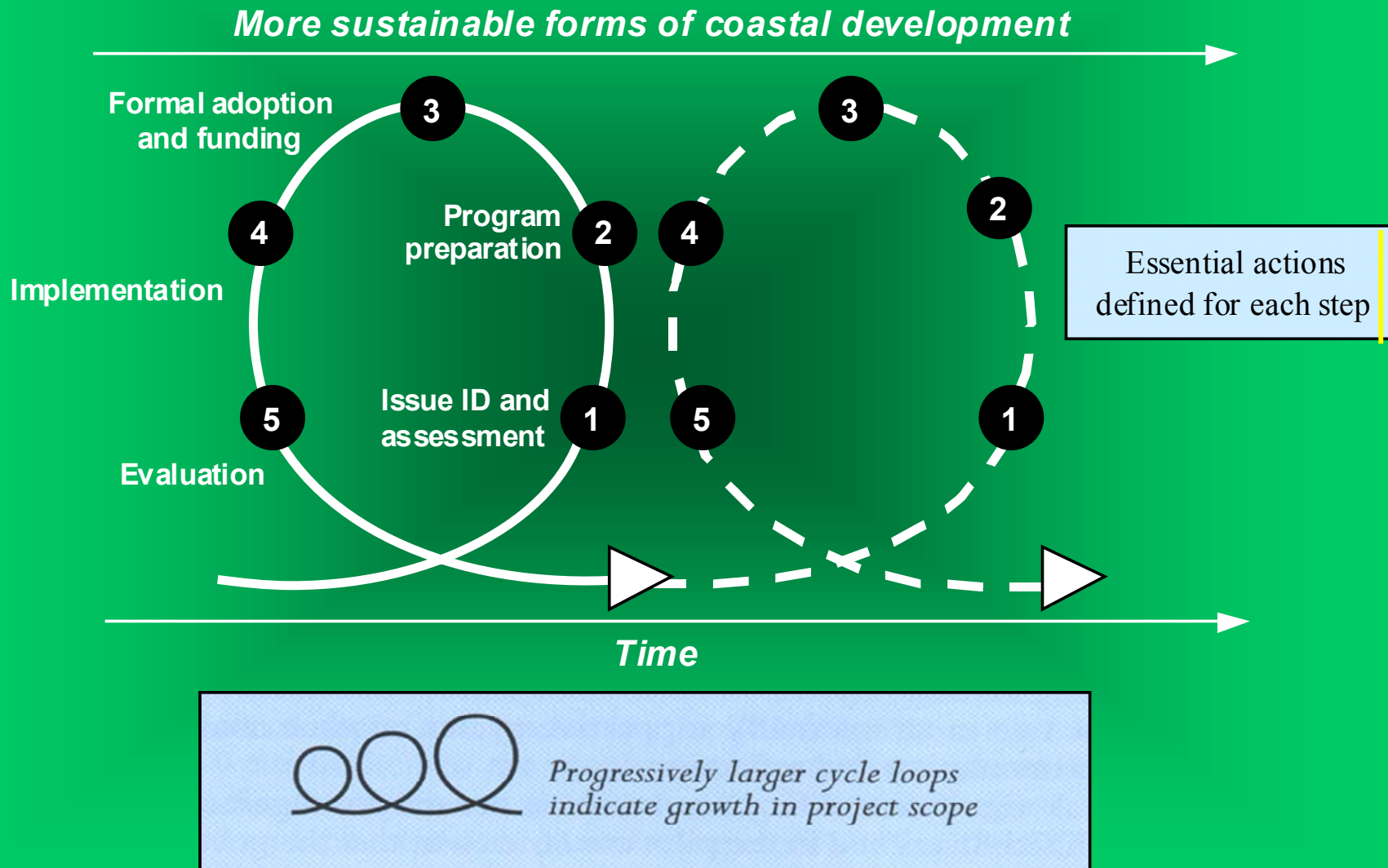
- Collaborative
- Set clear goals
- Limit issues to be addressed (strategic)
- Focus on actions that will yield short term results

How can CZM program
more explicitly address
issues of coral reefs,
climate change and
resilience?

Remember nested systems and a critical path for progress.....



Progressing along the critical path



A Model of Resilience

REPRESENTATION & REPLICATION

Habitat types
Multiples



Risk spreading

+

Resistant Communities
Spawning Aggregations

REFUGIA



Secure Sources of Seed

+

CONNECTIVITY

Transport



Replenishment

+

EFFECTIVE MANAGEMENT

Strong Recruitment



Enhanced Recovery

=

RESILIENCE

Resilience: Effective Management

Strengthen government at all levels

- Planning
- Implementation
- Enforcement

Address threats external to MPAs

- Land-based sources of pollution
- Development activities that affect coral reefs
- Sound construction, erosion control
- Reefs outside MPAs

Reduce human pressures

- Tourism controls
- Alternative livelihoods ??
- Fisheries management ??

Resilience: Risk Spreading

Promote enabling environment for Ecosystem Management

- System of resilient networks of MPAs
- Encourage linked coastal/ocean zoning and management



Rapid Response Actions

- Possible but challenging to establish
- Analogy to oil spill response plans
 - must be developed collaboratively
 - clear set of actions, authorities, responsibilities
 - LAS possible vehicle

Rapid Responses



- Monitoring
- Fisheries Management
- Tourism Management
- Education

Fisheries Management



Emergency
closures
(duration?)
Clear science
base ?
Mechanism for
enacting?
enforcing ?

Tourism



Engage tourists in solution?

Encourage other activities besides diving

constituency vs revenue issues

Mitigation of revenue losses (disaster relief??)

Reef Rehabilitation

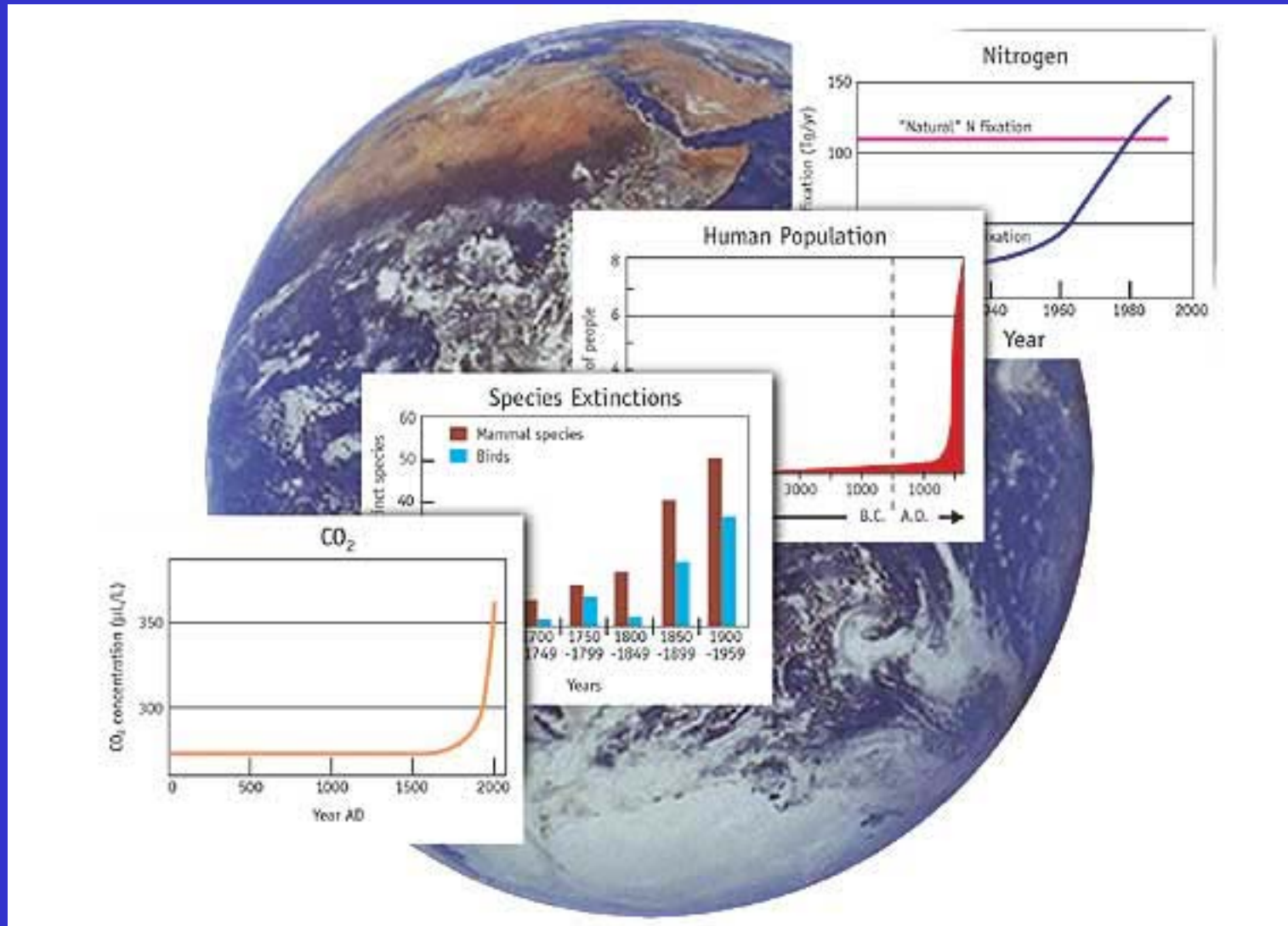


Enhance natural
resilience

Establish recovery
conditions?

Interventions at a
large scale?

ICM programs and Global Change



CZM and Global Change

- Changing populations / demographics
- Sea level rise....impacts on natural systems/built environment
- Changes in storm frequency and severity
- Eutrophication of waters
- Changes in river flows

Taking a longer term look....

CZM programs and LAS encourage us to look at feasible short term action; but

- longer term goals needed
- linkages between root causes and immediate actions must be made

CZM Programs and Climate Change

- Can help establish long term goals
- Can contribute to health of coral reefs inside and outside and MPAs
- Need close MPA / CZM program / Fisheries Management / Tourism connections
- Climate change issues must build on existing management programs